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NUCLEAR SAFEGUARDS

Under the provisions of the NPT, new safeguards arrangements under the auspices of the International Atomic Energy Association (IAEA) have replaced or will replace most bilateral and trilateral safeguards arrangements. The objectives of applying IAEA safeguards to nuclear materials are: (a) the timely detection of any diversion of significant quantities of material from peaceful nuclear activities, and (b) the deterrence of such diversion by the risk of early detection. To detect diversion, the IAEA must verify the quantities and location of safeguarded nuclear material. Application of uniform safeguards on a broad basis, covering entire national nuclear programs probably will be more effective than the multiplicity of systems and methods that have been used to date. For those countries who have signed the NPT, the possibility of being detected in a violation will be a strong deterrent to diversion of safeguarded nuclear materials into weapons production.

The IAEA's safeguards under NPT agreements are applied to processed uranium in all peaceful nuclear activities carried on by all parties to the Treaty other than the nuclear-armed signatories--the US, the USSR and the UK--with a view to preventing diversion of nuclear material from peaceful uses to nuclear weapons or other nuclear explosive devices. Thirty-three countries were covered by such agreements at the end of July 1974, although only 19 of the countries had nuclear programs significant enough to be safeguarded. IAEA safeguards also are applied to selected nuclear activities in non-NPT parties with a view toward ensuring that the special fissionable or other materials, services, equipment, facilities, and information under Agency controls are not used in such a way as to further any military purpose. Forty-one such agreements are in force dealing with specific facilities in 23 non-NPT countries, plus the US and the UK. Examples are the two US-supplied power reactors at Tarapur, India; the two Canadian-supplied power reactors in Rajasthan, India; the research reactor at Nahal Soreq, Israel; the major fraction of the Japanese and Swiss nuclear power programs; and research reactors in Argentina, South Africa and Brazil.

However, no safeguard system can provide absolute assurance that no fissionable material is diverted to weapons uses. Small undetected diversions are possible even with thorough inspection. Nuclear processing involves lost material in amounts that cannot be so precisely accounted for as to make diversion impossible. In practice, accountability is even less precise than it technically could be--because the IAEA lacks funds to buy the best possible equipment and because the most effective inspection methods would interfere with economically optimal operating methods. Moreover, some authorities (e.g., France) set relatively lax standards in their bilateral agreements. Inspectors do not have free run of nuclear facilities; because of deep concern in some countries about the possibility of industrial espionage, areas subject to inspection are narrowly defined. More importantly, safeguards detect diversion only after it has occurred; a country with a large stockpile of fissionable material can violate the treaty and face the consequences--at a minimum, the suspension of nuclear cooperation and supply by most other signatories--afterward.

The largest shortcoming, of course, is the number of countries where materials are not subject to inspection under the NPT. Mainland China, France, India, Israel, Brazil, Argentina, South Africa and Spain have not signed; most are unlikely to do so. Each is important as a potential source of technology or nuclear materials. Moreover, the major power signatories--the US, the UK and the USSR--are on their honor to refrain from providing assistance in nuclear weapons development to non-nuclear states, but no means exist for assuring compliance. While each appears sincerely opposed to proliferation, none can guarantee that all their citizens and government officials will abide by the treaty. Competition among the major nations supplying nuclear materials and equipment is likely to erode the effectiveness of safeguards in the future. Continuing growth of nuclear power programs, with increasing numbers of facilities to be controlled and ever growing amounts of fissionable materials moving in world markets, will add to the problem.

NUCLEAR SAFEGUARDS

INITIATION

- Imposed by NPT or by suppliers of nuclear materials and/or equipment or assumed unilaterally by recipients

PURPOSES

- Detect diversion of materials to unauthorized uses
- Deter such diversion by providing high likelihood of detection and of adverse political and economic consequences

SCOPE

- Recordkeeping and record audit—to maintain fullest possible accountability
- Influence over facilities design—to facilitate accurate checking
- Equipment such as tamper-indicating seals and surveillance devices
- Inspection for independent verification

CONTROLLING AUTHORITIES

- IAEA (International Atomic Energy Agency)
  - in connection with all transfers of relevant materials and equipment from any party to the NPT to any other country
  - on most arrangements predating the NPT and involving a party to it
  - on some arrangements entered into by non-parties who have nevertheless given jurisdiction to the IAEA
- EURATOM (same membership as European Economic Community)
  - administers own independent safeguards in all member countries
  - under agreement recently negotiated and approved by IAEA Board of Governors but not yet ratified by member countries, will fulfill IAEA's safeguarding functions in Germany, Italy, Benelux countries, Denmark and Ireland
- Supplier Governments
  - sometimes impose conditions that supplement or substitute for safeguards of multinational bodies

RELIABILITY

- IAEA system cannot provide absolute assurances that nuclear material has not been diverted
- Supplier governments impose conditions that range from extremely strict to extremely lax

LIMITATIONS

- Major power signatories of NPT—no means for assuring compliance
- Other signatories of NPT—only declared facilities are covered; areas subject to inspection are narrowly defined; surprise inspections are not practiced; materials used for non-explosive military purposes are exempt
- Important non-signatories of NPT (France, China, Israel, India, Spain, South Africa, Argentina, Brazil)—safeguards voluntary or non-existent
- IAEA safeguards under non-NPT agreements are interpreted by some countries as permitting peaceful nuclear explosives

Suppression

Inspection

free access